James Acker:
Morning Jan

We found out that sometimes WebEx can't handle formulas and animations

Jan Verbesselt:
Morning James

OK. would saving it in a different ppt format help. otherwise I'll quickly adjust the presentation.

James Acker:
I don't think so.

Sorry - Powerpoint animations work, but movies and animated GIFs don't appear to work.

Jan Verbesselt:
Ok. The animations do not seem to work either. I have quickly updated my presentation without animations. I'll upload now and then I am good to go and test the sound.

James Acker:
Jan, that's something that hasn't seem clear to most presenters - we do not have sound, just the chat box (I can save the chat log comments).

So you can play loud music in your office while you're presenting ;-)

Also, we will put the presentations online after the workshop, so people can see the animations then.

Several people have said that they cannot attend "live" but want to view the transcripts and presentations later.

Hello everyone; we're waiting for Dr. Verbesselt to upload his revised presentation.

As you can see, our first presenter is Jan Verbesselt from Wageningen University in the Netherlands.

Are you ready to go, Jan?

Jan Verbesselt:
The chat and comments from my side will be quite short. I'll do my best do explain things here - slide by slide. Let's start.

James Acker:
Thanks.

Jan Verbesselt:

The research is done by Martin and I at Wageningen University, and Achim at Innsbruck university.

I'll illustrate the idea of near real-time disturbance monitoring in the coming slides

More info can be found in the recent Remote Sensing Environment paper

The idea of near real-time disturbance monitoring can be understoon if you imaging you are a security guard watching multiple screens and you want to detect something abnormal automatically

this idea can be applied to satellite image time series (pixel = screen)

for one pixel you'll get a time series that looks like this

we want to detect change at the end of the time series and use the history period for that

but we have to make sure the history is "stable" or "representative"

in order to do so you can analyse time series using an approach that we have developped called BFAST

BFAST decomposes time series and detects structural changes within the trend and seasonal component

as such you can identify stable periods, i.e. periods without structural changes

(this is one approach and we have proposed a new approach in the recent RSE paper which I'll explain in the following slides)

So, the near real-time monitoring consists out of three steps

the graphs - explain the idea - here, as an example, we want to detect change in the monitoring period (i.e. the new data)

and use the history for modelling the reference

a stable history is automatically "estimated" (see following slides)

and use to model the data and predict into the future

here a change is detected.

These figures illustrate the idea and this idea/concept can be applied when new data is coming in

some details about the methodology: 1) a simple linear model + harmonic model is used

and we used the MOSUM and CUMSUM test for testing and detecting change

In these slides the idea/concept of the test is explained using 'river flow data from the Aswan dam, Egypt'

we test whether or not the flow is constant

CUSUM = cumulative sum of the residuals

MOSUM = Moving sum of the residuals using a moving window

when rescaling the CUMSUM, you can estimate significance for a "structural change" and in this case the break - corresponds to the building of a dam

So the example, illustrates also that it is important to account for structural changes in time series. Without doing so a wrong trend is estimated (e.g. a negative slope) while the slope/trend of the river flow is = zero.

We optimized the CUSUM to detect stability in the history period.

(i'll skip this example and move on to the Drought monitoring case)

Here we used the GIOVANNI system to extract monthly Rainfall Anomaly

which illustrates the intensity of the drought in south Somalia in 2010 onwards

when applying the BFASTmonitor, the approach, on MODIS NDVI time series and we check for significant disturbances

it confirms that there is a significant "negative magnitude" disturbance detected in South Somalia

These are a few examples for specific locations which illustrate how the 'monitoring' works

(b) a shorter stable history is identified

in conclusion/discussion:

1. you have different approaches to identify and deal with stable history. it depends on the objectives of the study

2. this approach can be optimised for rainfall data

3. it would be great to have a online disturbance detection system

The functionality if available via an package for R software (free and open source)

please check it out and let me know if you have questions

so thanks for your attention. Any questions?

James Acker:
We have time for a question.

Meanwhile, Jan, thank you for a great presentation. I think NASA scientists would be interested in this method for many different kinds of observations.

Jianfu Pan;
Do you remove anomalies when you construct "stable" history?

Jan Verbesselt:
Yes. thanks. happy to help and explore further options

no we do not remove the anomalies - it depends on your objective of course - we try to model

a "representative history"